

$$\begin{aligned}\text{vertical} &= \rho_g V \\ \text{aft} &= C_{x2} \rho V^{\frac{2}{3}} \left( K V_{s_0} \right)^2 \\ \text{side} &= C_{y2} \rho V^{\frac{2}{3}} \left( K V_{s_0} \right)^2\end{aligned}$$

where—

$\rho$ =mass density of water (slugs/ft.<sup>2</sup>);  
 $V$ =volume of float (ft.<sup>2</sup>);

$C_x$ =coefficient of drag force, equal to 0.133;

$C_y$ =coefficient of side force, equal to 0.106;

$K$ =0.8, except that lower values may be used if it is shown that the floats are incapable of submerging at a speed of 0.8  $V_{s0}$  in normal operations;

$V_{s0}$ =seaplane stalling speed (knots) with landing flaps extended in the appropriate position and with no slipstream effect; and  
 $g$ =acceleration due to gravity (ft./sec.<sup>2</sup>).

(g) *Float bottom pressures.* The float bottom pressures must be established under § 25.533, except that the value of  $K_2$  in the formulae may be taken as 1.0. The angle of dead rise to be used in determining the float bottom pressures is set forth in paragraph (b) of this section.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25–23, 35 FR 5673, Apr. 8, 1970]

#### § 25.537 Seawing loads.

Seawing design loads must be based on applicable test data.

#### EMERGENCY LANDING CONDITIONS

#### § 25.561 General.

(a) The airplane, although it may be damaged in emergency landing conditions on land or water, must be designed as prescribed in this section to protect each occupant under those conditions.

(b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury in a minor crash landing when—

(1) Proper use is made of seats, belts, and all other safety design provisions;

(2) The wheels are retracted (where applicable); and

(3) The occupant experiences the following ultimate inertia forces acting separately relative to the surrounding structure:

(i) Upward, 3.0g

(ii) Forward, 9.0g  
 (iii) Sideward, 3.0g on the airframe; and 4.0g on the seats and their attachments.

(iv) Downward, 6.0g

(v) Rearward, 1.5g

(c) For equipment, cargo in the passenger compartments and any other large masses, the following apply:

(1) Except as provided in paragraph (c)(2) of this section, these items must be positioned so that if they break loose they will be unlikely to:

(i) Cause direct injury to occupants;

(ii) Penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems; or

(iii) Nullify any of the escape facilities provided for use after an emergency landing.

(2) When such positioning is not practical (e.g. fuselage mounted engines or auxiliary power units) each such item of mass shall be restrained under all loads up to those specified in paragraph (b)(3) of this section. The local attachments for these items should be designed to withstand 1.33 times the specified loads if these items are subject to severe wear and tear through frequent removal (e.g. quick change interior items).

(d) Seats and items of mass (and their supporting structure) must not deform under any loads up to those specified in paragraph (b)(3) of this section in any manner that would impede subsequent rapid evacuation of occupants.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25–23, 35 FR 5673, Apr. 8, 1970; Amdt. 25–64, 53 FR 17646, May 17, 1988; Amdt. 25–91, 62 FR 40706, July 29, 1997]

#### § 25.562 Emergency landing dynamic conditions.

(a) The seat and restraint system in the airplane must be designed as prescribed in this section to protect each occupant during an emergency landing condition when—

(1) Proper use is made of seats, safety belts, and shoulder harnesses provided for in the design; and

(2) The occupant is exposed to loads resulting from the conditions prescribed in this section.

(b) Each seat type design approved for crew or passenger occupancy during